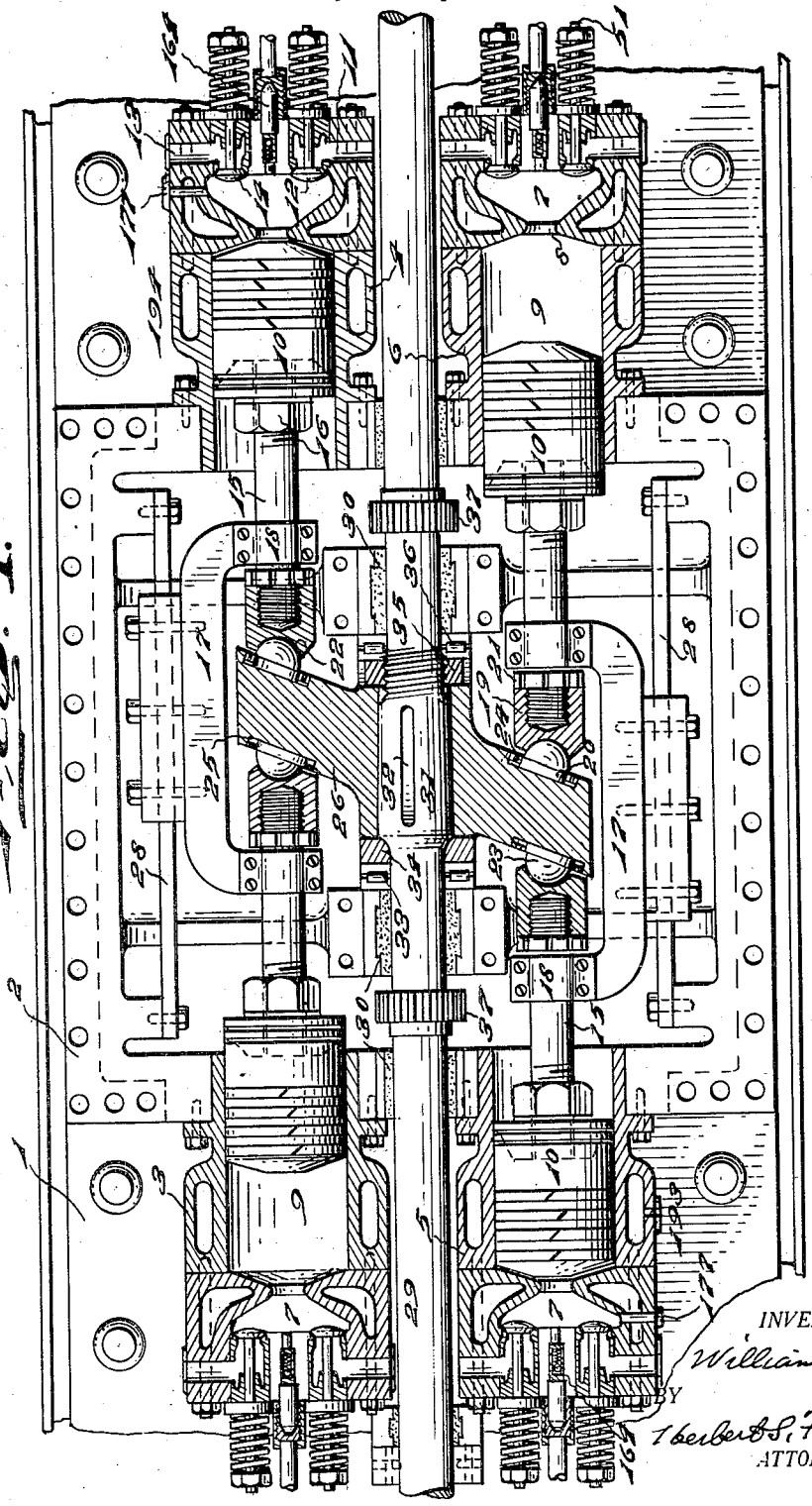
Oct. 6, 1931. W. F. PAUL 1,826,325

WOBBLE WHEEL POWER TRANSMISSION

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Fig. 1.



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Fig. 2.

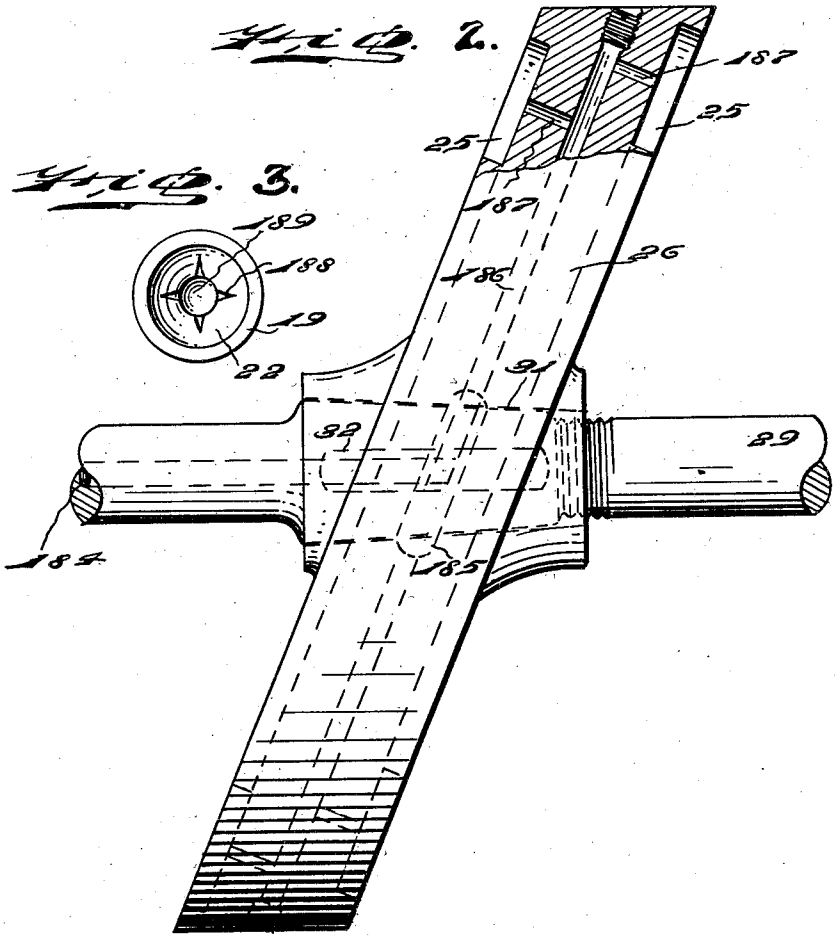
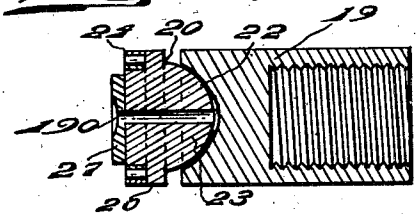


Fig. 3.

Fig. 4.



Fig. 5.



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Fig. 8.

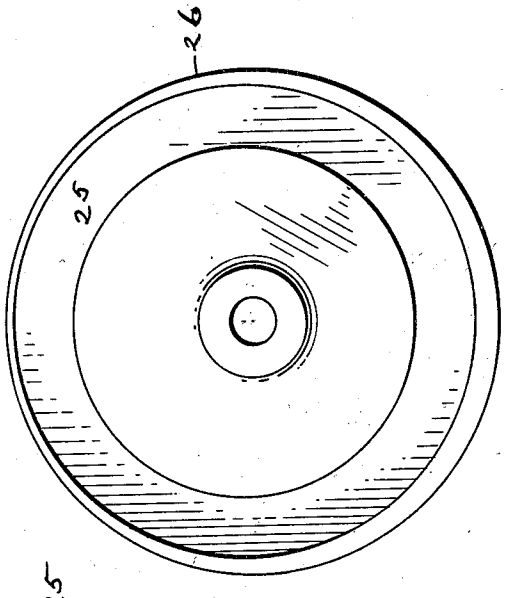


Fig. 7.

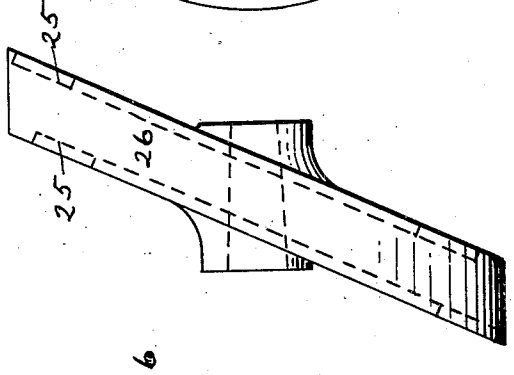
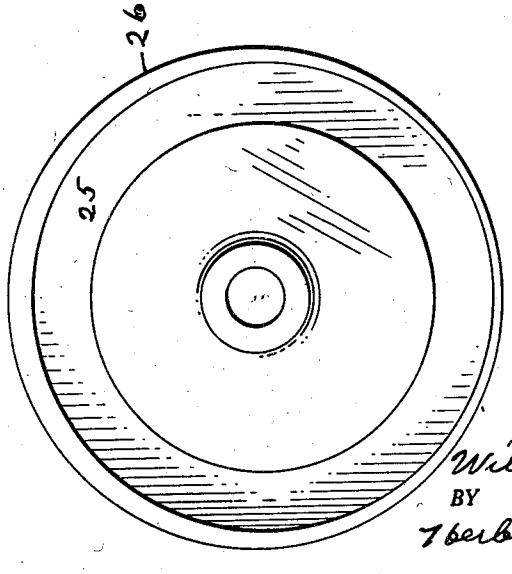


Fig. 6.



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UNITED STATES PATENT OFFICE

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WOBBLE WHEEL POWER TRANSMISSION

Application filed September 2, 1930. Serial No. 479,130.

The object of this invention is to devise a novel wobble wheel power transmission, which although especially designed for use with a Diesel engine can be driven by any desired type of power.

With the above and other objects in view, as will hereinafter more clearly appear, my invention comprehends a novel wobble wheel power transmission wherein power is applied to opposite sides of a wobble wheel to effect its revolution and thereby of the shaft to which it is connected.

It further comprehends a novel wobble wheel having on opposite sides thereof a novel construction and arrangement of tracks and novel power transmitting members which are provided with shoes to be received in said tracks, said shoes having anti-friction devices which engage the side walls of the tracks.

Other novel features of construction and advantage will hereinafter clearly appear in the detailed description and the appended claims.

For the purpose of illustrating the invention, I have shown in the accompanying drawings a typical embodiment of it, which, in practice, will give reliable and satisfactory results. It is, however, to be understood that this embodiment is typical only and that the various instrumentalities of which my invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a sectional plan view of a Diesel crankless engine, in conjunction with which a wobble wheel power transmission embodying my invention is employed.

Figure 2 is a front elevation, partly broken away, of the wobble wheel.

Figure 3 is an end elevation of a carrier employed.

Figure 4 is an end elevation of a shoe and carrier in assembled position.

Figure 5 is a sectional view of a shoe and its carrier.

Figure 6 is a side elevation of one side of the wobble wheel.

Figure 7 is a front elevation of the wobble wheel in detached position.

Figure 8 is a side elevation of the wobble wheel viewed from the opposite side to that seen in Figure 6.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:

I have preferred to illustrate my invention as being in the form of an eight cylinder engine of the full Diesel type, it being understood that the number of engine cylinders employed may be varied in accordance with conditions and requirements met with in practice.

1 designates the base which carries the frame 2 to which the engine cylinders 3, 4, 5 and 6 are connected, it being understood that there are four engine cylinders located above the engine cylinders 3, 4, 5 and 6.

Each engine cylinder is of the same construction and a description of one will therefore suffice for all.

Each engine cylinder has a combustion chamber 7 communicating by a port 8 with its piston chamber 9 in which latter a piston 10 reciprocates. 11 designates an air inlet port leading to a combustion chamber 7 and controlled by a spring pressed valve 12. 13 designates an exhaust port leading from a combustion chamber 7 and controlled by a spring pressed exhaust valve 14.

Each piston 10 is provided with a piston rod 15 in threaded engagement therewith and secured in adjusted position by means of a nut 16. Each piston rod passes through an arm of its respective cross head 17 and is secured thereto by a clamping member 18. The inner end of a piston rod is in threaded engagement with a shoe carrier 19 forming with a shoe 20, a ball and socket joint. A piston rod and its carrier are locked in adjusted position by means of a nut 21. Each carrier 19 is provided with a socket 22, into which is fitted the ball 23 of the shoe 20. The shoe 20 carries a roller bearing 24 which engages only the side walls of an annular guide groove or channel 25 in the side face of a wobble wheel 26. The shoes 20 are provided with bronze plates 27 which ride on

the bottom walls of the grooves 25. The cross heads 17 are slidable on and guided by the stationary bars 28, fixed to the engine frame.

29 designates the driven shaft which is mounted in bearings 30. The driven shaft 29 is provided with an enlarged tapered bearing portion 31 to which the wobble wheel 26 is connected by splines 32 so that the wobble wheel and shaft revolve in unison. The driven shaft 29 has a thrust bearing 33 against which bears a spacing washer 34 and a nut 35, in threaded engagement with the driven shaft 29, locks the wobble wheel 26 in fixed position on the shaft. A thrust bearing 36 is provided between the lock nut 35 and the juxtaposed bearing 30. It will be understood from the foregoing that I provide opposed pistons and the arrangement is such that the impulses are applied on opposite sides of the wobble wheele 26 to effect its revolution and thereby the revolution of the driven shaft 29.

The effective length of the piston rods 15 can be varied by adjustment of the nuts 16 or by adjustment of the nuts 21 and the shoe carriers 19. The driven shaft has fixed to it the sprocket gears 37 which are adapted to receive the timing chains.

It will be clear from Figures 6 and 8 that the tracks are elliptical with the high point on one side of the wobble wheel opposite to the low point on the opposite side of the wobble wheel.

Special attention is directed to the action of the wobble wheel. It will be seen that opposed explosions react against the wobble wheel simultaneous to effect its revolution, thereby the revolution of the driven shaft to which it is fixedly connected. In the present instance I use eight cylinders so that impulses are imparted to the wobble wheel progressively ninety degrees apart.

Special attention is also directed to the novel manner in which the ball and socket joint is constructed and cooperates with the grooves or channels in the wobble wheel which form guide tracks so that there can be no binding or retarding between the shoes and the wobble wheel.

The wobble wheel is mounted at an angle to the longitudinal axis of the driven shaft and I have found in practice that very advantageous results are obtained if this wobble wheel is mounted at an angle of 22½ degrees.

Special attention is directed to the novel construction and arrangement of the tracks on the wobble wheel which are disposed at the same angle as that of the wobble wheel and preferably at an angle of substantially 22½ degrees. I have found that if these tracks are not employed there is a great loss of efficiency and the wobble wheel becomes locked with the shoes and there is excessive wear on the pistons and the walls of the engine cylinders. This loss of efficiency, excessive friction and locking of the wobble wheel is overcome by the use of the tracks on the wobble wheel as herein disclosed.

In Figure 2 I have shown means for effecting the lubrication of the tracks and in Figure 5 means for effecting lubrication of the universal joint connection of a shoe and its carrier.

It will now be apparent that I have devised a new and useful wobble wheel power transmission which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that this embodiment is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a wobble wheel power transmission, a shaft, a wobble wheel operatively connected therewith, said wheel having surfaces to function as tracks, said tracks being eccentrically disposed relative to the axis of said wheel, instrumentalities cooperating with said wheel to transmit power, and means adjacent the outer edges of said tracks and forming a part of said wheel to prevent said instrumentalities from becoming locked with said wheel.

2. In a wobble wheel power transmission, a driven shaft, a wobble wheel fixedly connected therto and disposed at an angle to the longitudinal axis of said shaft and provided on opposite faces with endless guide tracks, shoes in said tracks, and means to cause said shoes to exert pressure against said tracks to effect the revolution of said wobble wheel.

3. In a wobble wheel power transmission, a driven shaft, a wobble wheel rigidly connected therewith and angularly inclined with respect to the shaft, and provided on opposite faces with endless tracks, shoes slidable in said tracks, rods having a universal joint connection with said shoes, and means to cause a rectilinear movement of said rods to effect the revolution of said wobble wheel.

4. In a wobble wheel power transmission, a driven shaft, a wobble wheel fixedly connected therewith and having annular guide tracks on opposite sides, said tracks being disposed eccentrically to the axle of said wheel, shoes cooperating with said tracks, carriers for said shoes, said shoes forming a ball socket connection, and means to cause said carriers and shoes to exert pressure against opposite sides of said wobble wheel to effect its revolution, and means adjacent the outer edges of

said tracks and forming a part of said wheel to prevent said shoes from becoming locked with said wheel.

5. In a wobble wheel power transmission, a driven shaft, a wobble wheel fixedly connected thereto in an inclined position and provided with annular guide tracks on opposite faces, said tracks being disposed eccentrically to the axis of said wheel, shoes cooperating with said tracks, push rods movably connected with said shoes, means to cause the effect of said push rods to be imparted to the wobble wheel at locations ninety degrees apart, and means adjacent the outer edges of said tracks and forming a part of said wheel to prevent said shoes from becoming locked with said wheel.

6. In a wobble wheel power transmission, a driven shaft, a wobble wheel rigidly connected therewith and angularly inclined with respect to the shaft, and provided on opposite faces with endless guide tracks disposed at right angles to the juxtaposed face of the wobble wheel, shoes in said tracks, anti-friction devices carried by said shoes to engage the side walls of its track, and means connected with said shoes to exert a pressure against opposite sides of said wobble wheel.

7. In a wobble wheel power transmission, a driven shaft, a wobble wheel fixed thereto in an inclined position and having on opposite sides endless tracks, shoes slidable in said tracks, push members having a universal joint connection with said shoes, anti-friction bearings for said shoes engaging the side walls of their respective tracks, cross heads fixed to opposite piston rods, guides on which said cross heads are slidable, and means to cause push rods on opposite sides of said wobble wheel to simultaneously exert a pressure against it to effect its revolution.

8. In a wobble wheel power transmission, a driven shaft, a wobble wheel fixed thereto in an inclined position and having endless tracks on opposite faces which are eccentrically disposed relatively to the axis of said driven shaft, the high point of the eccentric track on one side being opposite to the low point of the eccentric track on the opposite side, means to exert pressure against said tracks to effect the revolution of said wobble wheel and thereby of said driven shaft, and means adjacent the outer edges of said tracks and forming a part of said wheel to prevent said first means from becoming locked with said wheel.

WILLIAM F. PAUL.

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